U.S. Serial No. 10/556,922

Supplemental Office Action Dated: January 19, 2011

Supplemental Amendment A Dated: February 16, 2011

Amendments to the Claims:

Please amend claims 40-44, 47-60 and 76-78 and cancel claims 45, 46 and

61-75 without prejudice or disclaimer as follows:

1.-39. (Cancelled)

40. (Currently Amended) A heat exchanger unit for motor

vehicles, having comprising:

a first heat exchanger including two spaced collector pipes that are

connected together in terms of flow, wherein a cross-section of a wall of one of the

collector pipes of the first heat exchanger has a non-circular shape;

aas well as a second heat exchanger positioned adjacent to the first heat

exchanger and including, each of these heat exchangers having two spaced collector

pipes-situated at a distance from one another, and each, wherein the second heat

exchanger is a condenser and a cross-section of a wall of at least one of the collector

pipes of the second heat exchanger is one of oval, elliptical, or circular in shape, and

wherein a front wall of at least one of the collector pipes of the first heat exchanger faces

an adjacent collector pipe of the second heat exchanger, the front wall having a

continuously convex cross-section,

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<u>a first one of the collector pipe-pipes</u> of the first heat exchanger being <u>positioned</u> situated essentially adjacent to a-one of the collector <u>pipe-pipes</u> of the second heat exchanger, and <u>in addition the othera second one of the collector pipe-pipes</u> of the first heat exchanger being <u>situated essentially positioned</u> adjacent to the other collector pipe of the second heat exchanger, <u>and in additionand</u>

a collector connected to one of the collector pipes of the second heat exchanger

the two collector pipes of the first heat exchanger being connected to one another in terms of flow, and the two collector pipes of the second heat exchanger being connected to one another in terms of flow, and a cross section or cross sections of the covering wall of a collector pipe of the first heat exchanger having a non-circular shape, regarded perpendicular to the longitudinal axis, of this collector pipe, the second heat exchanger being a condenser, in particular an air conditioning condenser, and a collector 90 being situated on a collector pipe of the second heat exchanger, and the cross-section or cross-sections of the covering wall of at least one collector pipe of the second heat exchanger being essentially oval or (annularly) elliptical, or essentially circular in shape, regarded perpendicular to the longitudinal axis, of the relevant collector pipe; and the front wall of the peripheral wall of at least one collector pipe of the first heat exchanger, which is the wall facing an adjacent collector pipe of another heat exchanger, being

continuously convex in the cross-section regarded perpendicular to the longitudinal axis of this collector pipe.

41. (Currently Amended) A heat exchanger unit for motor vehicles, having comprising:

a first heat exchanger as well-asincluding two spaced collector pipes that are connected together in terms of flow, wherein a cross-section of one of the collector pipes of the first heat exchanger has a non-circular shape;

a second heat exchanger positioned adjacent to the first heat exchanger and including two spaced collector pipes that are connected together in terms of flow, wherein the second heat exchanger is a condenser, and wherein a cross-section of a wall of at least one of the collector pipes of the second heat exchanger is one of oval, elliptical, or circular in shape, each of these heat exchangers having two collector pipes situated at a distance from one another, and each

a first one of the collector pipe-pipes of the first heat exchanger being situated essentially adjacent to a one of the collector pipe pipes of the second heat exchanger, and in addition the othera second one of the collector pipe-pipes of the first heat exchanger being situated essentially adjacent to the other collector pipe of the second heat exchanger, and in addition the two collector pipes of the first heat exchanger being connected to one another in terms of flow, and the two collector pipes of the

second heat exchanger being connected to one another in terms of flow, and a crosssection or cross-sections of the covering wall of a collector pipe of the first heat exchanger-being non circular in shape, regarded perpendicular to the longitudinal axis, of this collector pipe, the second heat exchanger being a condenser, in particular an airconditioning condenser, and a collector being situated on a collector pipe of the second heat exchanger, and the cross-section or cross-sections of the covering wall of at least one collector pipe of the second heat exchanger being essentially oval or (annularly) elliptical, or essentially circular in shape, regarded perpendicular to the longitudinal axis of the relevant collector pipe; and the a front wall of the peripheral wall-of at least one of the collector pipe pipes of the first heat exchanger, which is the wall facing an adjacent one of the collector pipe-pipes of another-the second heat exchanger, wherein the front

a collector connected to one of the collector pipes of the second heat exchanger -regarded perpendicular to the longitudinal axis-of this collector pipe.

wall has a being continuously concave in the cross-section segment, and

42. (Currently Amended) A heat exchanger unit for motor vehicles, having comprising: a first heat exchanger including two spaced collector pipes that are connected together in terms of flow, wherein a cross-section of one of the collector pipes of the first heat exchanger has a non-circular shape; as well as and

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a second heat exchanger positioned adjacent to the first heat exchanger and

including, each of these heat exchangers having two spaced collector pipes situated at a

distance from one anotherthat are connected together in terms of flow, wherein the

second heat exchanger is a condenser, and wherein a cross-section of a wall of at least

one of the collector pipes of the second heat exchanger is one of oval, elliptical, or

circular in shape,, and each

a first one of the collector pipe pipes of the first heat exchanger being

situated essentially adjacent to aone of the collector pipe pipes of the second heat

exchanger, and in addition the othera second one of the collector pipepipes of the first

heat exchanger being situated essentially adjacent to the other collector pipe of the

second heat exchanger, wherein a front wall of at least one of the collector pipes of the

first heat exchanger faces an adjacent one of the collector pipes of the second heat

exchanger, the front wall having a convex segment and a concave segment, and in

addition the two collector pipes of the first heat exchanger being connected to one

another in terms of flow, and the two collector pipes of the second heat exchanger being

connected to one another in terms of flow, and a cross-section or cross-sections of the

covering wall of a collector pipe of the first heat exchanger being non-circular in shape,

regarded perpendicular to the longitudinal axis, of this collector pipe, the second heat

exchanger being a condenser, in particular an air-conditioning condenser, and

a collector being situated on a collector pipeconnected to one of the

collector pipes of the second heat exchanger, and the cross section or cross sections of

the covering wall of at least one collector pipe of the second heat exchanger being

essentially oval or (annularly) elliptical, or essentially circular in shape, regarded

perpendicular to the longitudinal axis of the relevant collector pipe; the front wall of the

peripheral wall of at least one collector pipe of the first heat exchanger, which is the wall

facing an adjacent collector pipe of another heat exchanger, having a convex segment and

a concave segment in the cross section regarded perpendicular to the longitudinal axis of

this collector pipe.

43. (Currently Amended) A heat exchanger unit for motor

vehicles, having comprising:

a first heat exchanger including two spaced collector pipes that are

connected together in terms of flow, wherein a cross-section of one of the collector pipes

of the first heat exchanger has a non-circular shape; as well as and

a second heat exchanger positioned adjacent to the first heat exchanger and

including two spaced collector pipes that are connected together in terms of flow,

wherein the second heat exchanger is a condenser, and wherein a cross-section of a wall

of at least one of the collector pipes of the second heat exchanger is one of oval,

elliptical, or circular in shape, each of these heat exchangers having two collector pipes situated at a distance from one another, and each

a first one of the collector pipe pipes of the first heat exchanger being situated essentially adjacent to a one of the collector pipe pipes of the second heat exchanger, and in addition thea second one of the other collector pipe-pipes of the first heat exchanger being situated essentially adjacent to the other collector pipe of the second heat exchanger, and a front wall of at least one of the collector pipes of the first heat exchanger facing an adjacent one of the collector pipes of the second heat exchanger, the front wall having a straight segment, and positioned at an incline relative to the collector pipes of this first heat exchanger; and in addition the two collector pipes of the first heat exchanger being connected to one another in terms of flow, and the two collector pipes of the second heat exchanger being connected to one another in terms of flow, and a cross-section or cross-sections of the covering wall of a collector pipe of the first heat exchanger being non-circular in shape, regarded perpendicular to the longitudinal axis, of this collector pipe, the second heat exchanger being a condenser, in particular an air conditioning condenser, and a collector being situated on a collector pipe of the second heat exchanger, and the cross-section or cross-sections of the covering wall of at least one collector pipe of the second heat exchanger being essentially oval or (annularly) elliptical, or essentially circular in shape, regarded perpendicular to the longitudinal axis of the relevant collector pipe;

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a heat exchanger block, having a plurality of <u>parallel</u> pipes oriented in parallel, being provided between the collector pipes of the <u>each of the first and secondrespective</u> heat exchangerexchangers; the

heat exchanger, which is the wall facing an adjacent collector pipe of another heat exchanger, having a flat or straight construction, regarded in the cross-section perpendicular to the longitudinal-axis of this collector pipe, and running at an incline to the pipes of this first heat exchanger.

- 44. (Currently Amended) A heat exchanger unit for motor vehicles, having comprising:
- a first heat exchanger <u>including two spaced collector pipes that are</u>

 <u>connected together in terms of flow, wherein a cross-section of one of the collector pipes</u>

 <u>of the first heat exchanger has a non-circular shape; as well as and</u>
- a second heat exchanger positioned adjacent to the first heat exchanger and including two spaced collector pipes that are connected together in terms of flow, wherein the second heat exchanger is a condenser, and wherein a cross-section of a wall of at least one of the collector pipes of the second heat exchanger is one of oval, elliptical, or circular in shape, each of these heat exchangers having two collector pipes situated at a distance from one another, and each

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a first one of the collector pipe pipes of the first heat exchanger being

situated essentially adjacent to a one of the collector pipepipes of the second heat

exchanger, and in addition the othera second one of the collector pipe-pipes of the first

heat exchanger being situated essentially adjacent to the other collector pipe of the

second heat exchanger, and a front wall of at least one of the collector pipes of the first

heat exchanger facing an adjacent collector pipe of the second heat exchanger, the front

wall having straight segments, which are positioned at an angle relative to a longitudinal

axis of one of the collector pipes of the first heat exchanger, the front wall and the

longitudinal axis forming an angle between 95° and 175° and in addition the two collector

pipes of the first heat exchanger being connected to one another in terms of flow, and the

two collector pipes of the second heat exchanger being connected to one another in terms

of flow, and a cross-section or cross-sections of the covering-wall-of a collector pipe of

the first heat exchanger being non-circular in shape, regarded perpendicular to the

longitudinal axis, of this collector pipe, the second heat exchanger being a condenser, in

particular an air-conditioning condenser, and

a collector being situated onconnected to a one of the collector pipepipes of

the second heat exchanger, and the cross section or cross-sections of the covering wall of

at least one collector pipe of the second heat exchanger being essentially oval or

(annularly) elliptical, or essentially circular in shape, regarded perpendicular to the

longitudinal axis, of the relevant collector pipe; and

a heat exchanger block, having a plurality of <u>parallel</u> pipes oriented in parallel, being provided between the collector pipes of the <u>each of the first and second</u> respective heat exchanger exchangers; the front wall of the peripheral wall of at least one collector pipe of the first heat exchanger, which is the wall facing an adjacent collector pipe of another heat exchanger, having segments that are straight or flat in shape, regarded in the cross section perpendicular to the longitudinal axis of this collector pipe, and which are situated at an angle to, or obliquely to, the longitudinal axis of a pipe of the first heat exchanger, enclosing with one another an angle in the range between 95° and 175°.

- 45. (Cancelled)
- 46. (Cancelled)
- 47. (Currently Amended) The heat exchanger unit of claim 40, wherein a cross-section or cross sections of the covering of a wall of at least one of the collector pipe pipes of one of the first heat exchanger and the and/or second heat exchanger, regarded perpendicular to the longitudinal axis of the relevant collector pipe, are constructed in such a way that includes overlapping wall segments are present.

48. (Currently Amended) The heat exchanger unit of claim 40, wherein the first heat exchanger unit has at least one heat exchanger that is a radiator and that has two collector pipes at a distance from one another, these two collector pipes of this heat exchanger being connected to one another in terms of flow, and in addition the eovering, wherein a wall of at least one or both of these the collector pipes of the first heat exchanger being is non-circular in shape, regarded in the cross-section or crosssections perpendicular to the longitudinal axis of the relevant pipe, and the wall, facing faces the other collector pipe of this the first heat exchanger, another wall of the covering wall of this collector pipe of the first heat exchanger being a floor wall, and wherein the

49. (Currently Amended) The heat exchanger unit of claim 40, wherein the first heat exchanger is a radiator, or has at least one radiator, and the second heat exchanger is an air-conditioner condenser.

floor wall of includesone or both of these collector pipes having a curved segment that is

curved in the named cross-section or cross-sections, or is essentially completely curved.

50. (Currently Amended) The heat exchanger unit of claim 40, wherein at least one of the collector pipe pipes of the first heat exchanger is limited by a floor wall (the floor wall) that is situated on the side facing that faces the other collector pipe of this first heat exchanger, and by a an outer wall (the outer wall) that is situated on

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the side facingthat faces away from the other collector pipe of this the first heat

exchanger, and by a front wall (the front wall) that faces the adjacent collector pipe of

the second heat exchanger, as well as by a and a rear wall (the rear wall) that faces away

from the adjacent collector pipe of the second heat exchanger, it being provided in

particular that the direction of longitudinal extension of these walls corresponds

essentially to the direction of longitudinal extension of this collector pipe of the first heat

exchanger.

51. (Currently Amended) The heat exchanger unit of claim 40,

wherein at least one wall-segment or a wall of the covering of the wall of a one of the

collector pipe pipes of the first heat exchanger is concavely curved, regarded in a cross-

section or in all cross-sections that is/are situated perpendicular to the longitudinal axis of

this collector pipe.

52. (Currently Amended) The heat exchanger unit of claim 40,

wherein at least one wall or a wall segment of the covering wall of a one of the collector

pipe pipes of the first heat exchanger is convexly curved, regarded in the cross-section or

cross-sections perpendicular to the longitudinal axis of this collector pipe.

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53. (Currently Amended) The heat exchanger unit according to Claim 52, characterized in that this wherein the convexly curved wall-segment and/or this convexly curved wall-is curved in such a way that various radii of curvature (R) are present in this wallthe convexly curved segment or in this wall.

- Claim 52, characterized in that this wherein the convexly curved wall-segment or this convexly curved wall-is curved in such a way that the (segment) length (s_{total}) of this the convexly curved wall-segment or of this convexly curved wall-segment is less than (0.5* $x*\pi$) times the radius of curvature (R) of this wall-segment or of this wall, x being greater than zero and less than 0.8.
- Claim 52, characterized in that this wherein the convexly curved wall-segment or this convexly curved wall-is curved in such a way that along the (segment) length (s_{total}) of this convexly curved wall-segment, or of this convexly curved wall segment, various radii of curvature (R) are provided, the (segment) length (s_{total}) being less than (0.5*x* π) times the a minimum radius of curvature ($R_{minimum}$) of these radii of curvature (R), and x being greater than zero and less than 0.8.

56. (Currently Amended) The heat exchanger unit according to Claim 52, characterized in that this wherein the convexly curved wall segment, or this convexly curved wall, is curved in such a way that along the (segment) length (s_{total}) of this convexly curved wall, or of this convexly curved wall segment, various radii of curvature are provided, the (segment) length (s_{total}) being less than (0.5*x* π) times the mean radius of curvature (R_{mean}) of this the wall-segment or of this wall, x being greater than zero and less than 0.8, and the mean radius of curvature (R_{mean}) corresponding to the quotient of an integral and the (segment) length (stotal), this integral being the integral of (s*R(s))ds within the limits s=0 and s=s_{total}, s being the path running along the convexly curved wall-segment, or along the convexly curved wall, and R(s) being the radius of

(Currently Amended) 57. The heat exchanger unit according to Claim 52, characterized in that wherein the front wall and/or the floor wall has such includes said a convexly curved wall segment, or is such a curved wall segment.

curvature at a particular position along this path.

58. (Currently Amended) The heat exchanger unit according to Claim 5750, characterized in that wherein the rear wall and the outer wall each have a flat construction, or, in the cross-section perpendicular to the longitudinal axis of the collector pipe, an essentially straight construction, and are oriented essentially perpendicular to one

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another, it being provided in particular that the rear wall is being oriented essentially

parallel to (coolant) pipes that produce a flow connection between the two collector pipes

of the first heat exchanger.

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59. (Currently Amended) The heat exchanger unit according to

claim 40, characterized in that the coveringa wall of a one of the collector pipe pipes of

the first heat exchanger has adjacent wall-segments that are essentially flat or straight and

that enclose with one another define an angle between 95° and 175°, preferably in the

range from 100° to 170°, regarded in the cross-section perpendicular to the longitudinal

axis of the collector pipe of the first heat exchanger.

60. (Currently Amended) The heat exchanger unit according to

claim 41, characterized in that wherein at least one of the collector pipes and the

connection in terms of flow of the collector-pipes, and/or the entire heat exchanger unit,

are made of aluminum.

61.-75. (Cancelled)

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76. (Currently Amended) The heat exchanger unit according to claim 52, characterized in that the covering wherein a wall of a collector pipe of the first

heat exchanger has adjacent wall-segments that are essentially flat or straight and that

define enclose with one another an angle between 95° and 175°, preferably in the range

from 100° to 170°, regarded in cross-section perpendicular to the longitudinal axis of the

collector pipe of the first heat exchanger.

77. (Currently Amended) The heat exchanger unit according to

claim 76, characterized in that wherein the front wall has at least two such adjacent flat or

straight wall-segments that enclose with one anotherdefine an angle between 95° and

175°, preferably in the range from 100° to 170°, regarded in the cross-section

perpendicular to the longitudinal axis of the collector pipe of the first heat exchanger.

78. (Currently Amended) The heat exchanger unit according to

claim 52, characterized in that wherein at least one of the collector pipes and the

connection in terms of flow of the collector pipes, and/or the entire heat exchanger unit;

are made of aluminum.